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METEOROLOGICAL DEPARTMENT

INDIA WEATHER REVIEW

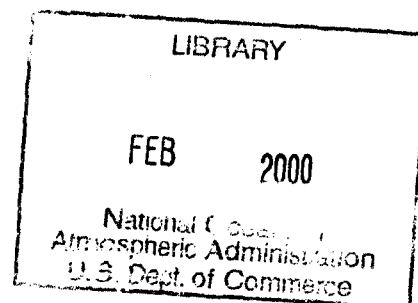
ANNUAL SUMMARY FOR 1931

PART B.
SNOWFALL

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ANNUAL SUMMARY, 1931.

PART B.⁽¹⁾

SNOWFALL.

Cold-weather period, January and February.

I.—PERSIA.

No reports were received.

II.—AFGHANISTAN.

Kabul.—Frequent falls occurred during the period under report. A heavy fall which gave 0".91⁽²⁾ of equivalent rain was reported on the 20th January 1931. Snowfall was unusually heavy in the eastern districts of Afghanistan, particularly round Ghazni.

III.—BALUCHISTAN.

Quetta.—On nine days in January and thirteen days in February snow or rain fell. The amounts measured were 2".55 and 5".33 for January and February respectively. For both the months the falls were heavier than usual.

IV.—NORTH-WEST FRONTIER PROVINCE.

(a) *Hazara.*—The snowfall for January was normal while that for February was above normal. The accumulations at the end of January were normal while at the close of February they were above normal. Abbottabad reports normal falls for the period.

(b) *Dir, Swat and Chitral.*—Chitral had seven days of snowfall in January and eight days in February. The amounts were 2' 5" and 2' 3½" for the respective months and were above normal.

(c) *Khyber Agency.*—Snowfall was below the average.

(d) *Kohat.*—Fort Lockhart had 5½ feet and 1½ feet of snowfall during January and February respectively.

(e) *North Waziristan.*—From the graduated snow-box set up at Razmak it was found that 2' ½" and 2' 8½" of snow fell in January and February respectively. The accumulations on the surrounding peaks were reported to be normal.

V.—KASHMIR.

(a) *Skardu.*—Snow fell on twelve days in January which amounted to a total of 1".02. February witnessed 9 days of fall with a total of 0".72. Depths of accumulations measured 7' and 5' respectively for January and February.

(b) *Dras.*—Snowfalls were frequent during the months but no snowstorm was seen. The total amount was below normal.

(c) *Srinagar.*—The first fall was recorded on the 11th January and was followed by several others. The total precipitation during the month was 2".25 being below normal. In February snow fell on 14 days in the main valley giving a total precipitation of 3".52 which was slightly below normal.

(d) *Kargil.*—Snow fell on nine days each in January and February the amounts measured being 1".04 and 2".66 respectively for the months. On the higher passes snow lay to a depth of 3 ft. at the end of January and 3½ ft. at the end of February. The falls were defective during the period.

VI.—PUNJAB.

(a) *Rawalpindi.*—Snow fell five times in January and eleven times in February. The total amount during the former month was 1' 6" while during the latter it was 3' 9½". The falls during the season were above normal.

(b) *Kulu (Kangra District).*—During January there was no snowfall in the district except on the high ranges of the Himalayas. In February the falls were confined to elevations above 6,000 ft. M. S. L. Normal precipitation is recorded for the period.

(c) *Simla.*—On nine days in January and on seventeen days in February snow fell. The amounts measured ¾ ft. during January and 2 ft. 9½ inches in February and were below normal for both the months. The depths of accumulations at the various hill tops were as follows:—

Locality.	At the end of January.	At the end of February.
	Ft.	Ft.
Kailash Peak	15	20
Rupan Pass	10	13
Shatul Pass	9	11
Buran Pass	10	13

VII.—UNITED PROVINCES.

(a) *Almora.*—The following tables give the actuals and accumulations of snow for the two months:—

⁽¹⁾ This part is based on the reports received mainly from the local Government officers who in their turn, collect the required information from the local residents.

⁽²⁾ When amounts are given in inches it is to be understood that the snow has been melted and measured as water and when mentioned in feet the depth of snow lying on the ground is meant.

ACTUALS.

Locality.	Amounts of snow for January.	Amounts of snow for February.
	Ft.	Ft.
Biyans	5	43
Malla Darma	6	32

ACCUMULATIONS.

Locality.	At the end of January.	At the end of February.
	Ft.	Ft.
Nuwe Pass	15	35
Lampia Pass	18	48
Lepu Pass	12	33

Snowfall was below normal in January and above it in February.

(b) *Garhwal*.—During one day in January and eight days in February snowfall was recorded.

VIII.—ASSAM.

(a) *Kamrup*.—The following is a table of actual falls recorded during the period:—

Locality.	January.	February.
	Ft. in.	Ft. in.
Khampa	1 2	1 4
Chirkimla	1 2	1 3
Ongla	0 3	0 4
Chungkhar	0 3	0 4
Pangkhar	0 3	0 3
Kapegangree	4 5	4 6
Toopkang	0 3	0 3
Oangchengla	1 6	1 8
Chakleng	1 2	1 4
Tawyoung	1 5	1 6
Karila	0 4	0 6
Thum Chengla	1 8	1 6
Bamtang	1 6	1 7
Cherkemla	1 0	1 1

Falls during the period were normal.

(b) *Sadiya Frontier Tract*.—There was no snowstorm during the period, and snowfall was less than normal.

(c) *Baliapara Frontier Tract*.—Severe snowstorms were reported. Se la, Bomju la, and Pakka La had accumulations to greater depths than usual.

The Hot Weather Period, March to May.

I.—PERSIA.

No reports have been received.

II.—AFGHANISTAN.

Kabul.—The last fall for the season occurred on the 6th March. At the end of May the accumulations on the Paghman range and on the Hindu Kush were above normal.

III.—BALUCHISTAN.

Quetta.—No snow fell during the period, and no trace of it was left on any pass in Baluchistan by the 1st of May. On the northern slopes of the higher peaks traces of snow were observed even as late as the 12th May, on which date actual snowfall was noted on "Kand" the peak at the head of the Zhob valley—elevation 10,800 ft. M. S. L.

IV.—NORTH-WEST FRONTIER PROVINCE.

(a) *Hazara*.—The falls were above normal. The depths of accumulations of snow between the heights of 10,000 to

17,500 ft. above mean sea level ranged from 2½ ft. to 7 ft. at the end of the period.

(b) *Dir, Swat and Chitral*.—Chitral reported two days of snowfall for each of the months April and May at elevations above 7,000 ft. The total amounts were 4 inches and 1 inch respectively for the months. On the Lowari pass at a height of 10,000 ft. above mean sea level the accumulations were reported to be 2 ft.

(c) *Khyber Agency*.—Very little snowfall was experienced.

(d) *Kohat*.—1' 5" of snow was reported for March 1931. No more falls occurred during the rest of the period.

(e) *North Waziristan*.—Razmak reports ¼ ft. of snow in March and normal accumulations at the end of May.

(f) *Dera Ismail Khan*.—Snow lay on the Takht-i-Suleiman till about the middle of April.

V.—KASHMIR.

(a) *Skardu*.—Snowfall was reported for one day in March, six days in April and eleven days in May. The amounts

of total precipitation recorded were 0".39, 2".44 and 1".16 respectively for the three months.

(b) *Dras*.—Several light falls of snow occurred during March and April but no snow storm. In May three snow-falls were recorded. At the end of March all the surrounding passes and peaks were covered with deep snow while the station had a sheet of snow 2½" deep. By the last week of April no snow existed on the ground, the peaks towards the west and south had a thick cover of snow and those towards the north and east had but a light coating. Conditions were not very different at the end of May. Both the falls and accumulations throughout the period were below normal.

(c) *Srinagar*.—March witnessed three light falls in the main valley, April five on the surrounding hills while May recorded several light falls on the surrounding high mountains. The precipitation figures for the respective months were 0".71, 2".39 and 4".34. These were below normal during the first two months and above it during the last month of the period.

(d) *Kargil*.—Snow fell on two days in March and one day in April amounting to 0".33 and 0".01 of equivalent rain. There were no falls in May. The snowfall for the whole period was less than normal. The depths of accumulations on the well-known higher passes of the district were 2½ ft. at the end of March and 2 ft. at the end of April.

VI.—PUNJAB.

(a) *Rawalpindi*.—On three days in March falls occurred, the total height being 3½ ft. By the end of March there was no trace of snow on the surrounding hills.

(b) *Chamba*.—The rainy days in May were generally accompanied by light falls of snow on altitudes above 9,500 ft. The accumulations on the well-known passes and peaks at the end of the period were reported to be 6" deep and were below normal.

(c) *Kulu (Kangra District)*.—During the month of March the falls were confined to elevations above 8,000 ft. M. S. L. None was observed during April while in May falls were experienced at heights above 10,000 ft. M. S. L. Accumulations at the end of May on the well-known passes and peaks are set forth in the following table :—

Locality.	Depth of Accumulations.
	Ft.
Rohtang Pass	5
Hampta Pass	8
Pujadhar	3½
Chandarkhani	3

Both the falls and accumulations were above normal.

(d) *Kilba (Simla District)*.—Snow fell on eight days in March, two days in April and nine days in May. The total amounts for the respective months were 2 ft. 2¼ in., ½ ft.

and ¾ ft. The accumulations at the end of each month on the well-known peaks and passes are given in the following table :—

Locality.	DEPTH OF ACCUMULATIONS.		
	March.	April.	May.
	Ft.	Ft.	Ft.
Kailash Peak . . .	19	12	9
Rupan Pass . . .	12	7	4
Buran Pass . . .	12	6	3½
Shatul Pass . . .	10	6	3½

The falls and accumulations were normal for the period.

VII.—UNITED PROVINCES.

(a) *Almora*.—The following tables give an idea of the falls and accumulations by the end of each of the months of the period :—

ACTUALS.

Locality.	March.	April.	May.
	Ft.	Ft.	Ft.
Biyans	6½	8½	5
Malla Darma . . .	12½	3½	5½
Malla Johar . . .	..	..	6
Malla Danpur . . .	..	..	1½

ACCUMULATIONS.

Locality.	March.	April.	May.
	Ft.	Ft.	Ft.
Nuwe Pass	12½	15	14
Lepu Lekh Pass . .	5	10	10
Lampia Pass . . .	7½	14	15
Pindari Pass . . .	..	..	4
Kafini Pass . . . .	..	..	4
Kantila Pass . . .	..	..	4
Puwalidwar Pass . .	..	..	4
Nandakote Pass . .	..	..	4

Average conditions are reported for March while for the rest of the period they were above the average.

(b) *Garhwal*.—During the first week of March two falls—the last for the season—were witnessed.

VIII.—ASSAM.

(a) *Kamrup*.—The following table gives the amounts of falls reported during March :—

Locality.	Amount.	
	Ft.	in.
Khampa	1	0
Chirkimla	1	0
Ongla	0	8
Chungkhar	0	3
Pangkhar	0	2
Kapegangree	3	0

VIII.—ASSAM—contd.

Locality.	Amount.	
	Ft.	in.
Toopkang	0	2
Oangchengla	1	0
Chakleng	0	10
Tawyoung	1	0
Karila	0	5
Thum Chengla	1	0
Bamtang	0	11
Cherkemla	0	10

(b) *Sadiya Frontier Tract*.—There was snowfall in the latter part of April which is rather unusual. Falls were normal in character.

(c) *Baliapara Frontier Tract*.—Accumulations are reported to be more than usual.

South-West Monsoon Period, June to September.

JUNE AND JULY.

I.—PERSIA.

No reports have been received.

II.—AFGHANISTAN.

Kabul.—The Hindu Kush and Paghman ranges had more snow than last year. By the middle of July all the passes to the north were open.

III.—BALUCHISTAN.

No reports were received.

IV.—NORTH-WEST FRONTIER PROVINCE.

(a) *Dir, Swat and Chitral*.—Round about Malakand no snow fell during the period under report. Accumulations on the Lowarai peak were normal while those on the Swat hills were less than normal.

On the mountains near Drosh two light falls occurred in July; accumulations at the end of the period at heights of 12,000 ft. and 13,000 ft. were 3 feet and 6 to 10 ft. respectively. Chitral reports a fall $\frac{1}{2}$ ft. in July.

(b) *Khyber Agency*.—Near about Tirah no falls are reported during the period.

By the end of the period Lakarai, and Gurdama had deep accumulations of snow while only traces were visible on Audina and Malaka.

(c) *Kurram*.—No falls were reported. The accumulations at the end of the period were slightly more than normal.

(d) *South Waziristan*.—At the end of the period no snow remained on the mountains in Waziristan.

V.—KASHMIR.

(a) *Skardu*.—Fresh snowfall was observed on the high peaks on the 26th June. Accumulations on the neighbouring peaks at the end of the period measured about $1\frac{1}{2}$ ft.

(b) *Dras*.—No snowfall or snowstorm occurred at the station during the period; the surrounding mountains had two falls in July. At the end of June slight snow existed on the neighbouring peaks, while at the end of the period they were confined to the distant higher peaks.

(c) *Srinagar*.—A few light falls of snow were observed on the surrounding high mountains in June, while during July moderate falls descending to lower mountain skirts were visible. Accumulations at the end of the period were greater than normal.

(d) *Gulmarg*.—Several fresh light to moderate falls of snow were observed on the Affarwat range during June. In July light falls on two days were observed on the surrounding high mountain ranges. The accumulations at the end of the period are reported to be in defect.

(e) *Kargil*.—No snowfall was experienced during the period. The depth of accumulations on the well-known higher passes of the district measured one foot at the end of June and six inches by the end of July.

(f) *Sonamarg*.—Snow accumulation on the well-known passes and peaks was comparatively greater than last year.

(g) *Gurez*.—From the 23rd June to the 10th July weather remained rainy with lightning, thunder, hail-storms, and mist followed by light snowfalls on high peaks. Tragbal pass had $\frac{1}{2}$ ft. of snow and Burzil one foot.

VI.—PUNJAB.

(a) *Chamba*.—In June, during rainy days light falls of snow occurred at elevations of 12,000 ft. and above, in the Ravi valley. In the Chenab valley light falls of snow were experienced at elevations of 11,000 feet and above. In July snowfall was below the average. The accumulations at the end of the period were nearly normal.

(b) *Kilba (Simla District)*.—There was no snowfall on the Kilba range during the period. The following is a statement of accumulations on the well-known passes and peaks at the end of June and July:—

Locality.	ACCUMULATIONS AT THE END OF			
	June.		July.	
	Ft.	In.	Ft.	In.
Kailash Peak	7	0	7	0
Rupan Pass	2	6	2	0
Buran Pass	2	0	1	6
Shatul Pass	2	0	1	6

VII.—UNITED PROVINCES.

(a) *Almora*.—The following tables give the amount of falls and accumulations at the end of each month.

ACTUALS.

Locality.	June.		July.	
	Ft.	In.	Ft.	In.
Malla Danpur	1	3	0	6
Malla Darma	5	6	5	0
Biyans	3	6	7	6
Malla Johar . . . . .	..		9	0

ACCUMULATIONS.

Locality.	AT THE END OF			
	June.		July.	
	Ft.	In.	Ft.	In.
Nuwe Pass	12	0	7	0
Lepu Pass	3	0	6	0
Lampia	4	6	8	6
Pindari Pass	1	3	0	6
Kafini Pass	1	3	0	6

ACCUMULATIONS—contd.

Locality.	AT THE END OF			
	June.		July.	
	Ft.	In.	Ft.	In.
Puwalidwar Pass	1	3	0	6
Nandakote Pass	1	3	0	6
Kantila Pass	1	3	0	6
Milain Pass	Not available.		1	6
Bagdwar Pass	Do.		1	0

The falls and accumulations were above normal.

(b) *Garhwal*.—In June snow fell twice about five inches deep on the top of the high mountains and about two inches in the passes, which melted soon after the falls. The accumulations on the neighbouring peaks are two to three feet deep.

VIII.—ASSAM.

No reports have been received.

AUGUST AND SEPTEMBER.

I.—PERSIA.

No reports have been received.

II.—AFGHANISTAN.

No falls were reported.

III.—BALUCHISTAN.

No falls were reported.

IV.—NORTH-WEST FRONTIER PROVINCE.

No falls were reported.

V.—KASHMIR.

(a) *Skardu*.—No falls occurred at the station during the period under report; but very light falls were observed on the high peaks of the adjacent mountains on the 24th and 25th September.

(b) *Dras*.—No falls were experienced at the station. In September slight snowfall was recorded on the high peaks. Throughout the period the higher peaks were snow-capped.

(c) *Srinagar*.—No falls were observed in August. In September light falls were observed on the surrounding high mountains.

(d) *Gulmarg*.—No falls occurred during August but a few hailstorms are reported. In September several fresh light falls were observed on the Afarwat range. Frequent hailstorms are reported from the station.

(e) *Kargil*.—There was no snowfall during the period. The depth of accumulations on the higher passes of the district at the end of August was 4 inches while it was 3 inches at the end of the period.

VI.—PUNJAB.

No reports have been received.

VII.—UNITED PROVINCES.

(a) *Almora*.—The actual amounts of snow are given in the following table:—

Locality.	August.		September.	
	Ft.	In.	Ft.	In.
Malla Darma	8	3	14	6
Biyaas	7	9	23	0
Malla Danpur	0	6	0	6

The falls for the period were above normal.

The accumulations at the end of each month are set forth in the following table:—

Locality.	ACCUMULATIONS AT THE END OF			
	August.		September.	
	Ft.	In.	Ft.	In.
Nuwe Pass	0	0	13	0
Lampia Pass	9	0	11	0
Lepu Pass	6	0	9	0
Pindari Pass	0	6	0	6
Kafini Pass	0	6	0	6
Puwalidwar Pass	0	6	0	6
Nandakote Pass	0	6	0	6

The accumulations were above normal.

VIII.—ASSAM.

No falls were reported.

The retreating monsoon period, October to December.

I.—PERSIA.

Information is not available.

II.—AFGHANISTAN.

Kabul.—A fall of snow occurred in Kabul on October 28th and 29th, the equivalent amount of water being 1".58. This fall was followed by another only on the 7th December which gave precipitation of 0".32 of water. This fall was particularly heavy in the Ghazni Mukur area of Afghanistan. The Paghman range and the Hindu Kush appeared to have more snow than this time last year; the snow level appeared rather lower, though reports stated that the passes were still open.

III.—BALUCHISTAN.

Quetta.—The first snowfall occurred on the 9th December; though it was very light, it affected a wide area including the Khojak Pass, Takatu, Chittan, Murdan, Zarghun, Kand (at the head of the Zhob valley), Shinghar, and Takhti-Suleiman. On the Khojak Pass a light sheet of snow lay by the middle of December on all the northern slopes up to an elevation of 6,500 ft. Slight accumulations are noticed on Khalifat and on the hills round Ziarat.

IV.—NORTH-WEST FRONTIER PROVINCE.

(a) *Hazara*.—The falls were late to commence and were much below normal.

(b) *Dir, Swat and Chitral*.—The following are the particulars about the falls in Chitral:—

Month.	No. of days of fall.	Total amount.
		Ft. In.
October	5	4 8
November	2	2 0
December	3	2 8

These are but normal. The depth of snow on the Lowarai Pass by the end of the season varied from 5 ft. to 10 ft. On the Drosh side of the pass the accumulations extended to about three miles below Ziarat Post. For four days in the middle of the month the Pass was closed owing to a snow-storm. The Hindu Raj range and the hills in the Mastuj area were covered with snow above elevations of 8,000 ft. M. S. L.

(c) *Kurram*.—Slight falls are reported on the surrounding hills on six days in October, and four days in November. The November falls are reported to be heavy. The occurrence of snowfall is said to be earlier and more than in previous years.

(d) *Kohat*.—On Fort Lockhart there were falls only in December. The total amount measured 1" of equivalent rain.

(e) *South Waziristan*.—Light snowfalls are reported to have fallen on the Marwatai range and Janimola mountains on the 11th December. In Razmak the 9th of December witnessed falls on the Shindar, Spinkamar and Preghal mountains.

V.—KASHMIR.

(a) *Skardu*.—No falls occurred in October while in November on eighteen days falls were observed on the adjacent mountains. In December the 7th and the 8th witnessed falls throughout the Skardu Tahsil, amounting to 0".18 of equivalent rain. The accumulations on the mountain peaks at the ends of October, November and December were 3, 2½ and 2 feet respectively.

(b) *Dras*.—One snowstorm and frequent light falls on the surrounding peaks are recorded for October; snowstorms numbered seven in November and four in December. Accumulations on the well-known peaks like Zogilla were 3 inches deep at the end of October, two feet at the end of November and three feet at the end of December. Falls and accumulations in October and December were below normal while those for November were normal.

(c) *Srinagar*.—Light falls were observed on the mountain peaks throughout the period under report.

(d) *Gulmarg*.—No falls were observed in October. Reports for the rest of the period have not been received.

(e) *Kargil*.—Reports none in October, three in November and two in December. The total amounts were 0".24 and 0".07 respectively for these two months. Depth of accumulations on the well-known higher passes of the district rose from 3 in. at the end of October to 1 ft. at the end of the period. The falls were in defect throughout the period.

(f) *Sonamarg*.—Reports indicate occasional light falls which were below normal.

(g) *Gurez*.—Falls are reported on the 14th October, 9th to 12th and 21st to 24th of November and 5th to 7th December.

(h) *Leh*.—Light occasional falls are reported on heights above 13,000 ft.

VI.—PUNJAB.

(a) *Kulu (Kangra District)*.—On the high peaks there was a little snowfall. There were two to three feet of accumulations on the Rohtang and Hampta Passes at the end of the period. The snowline was above 10,000 ft. M. S. L.

(b) *Kilba Hills (Simla District)*.—No regular snowfall was recorded during the period except for a light fall of half an inch which occurred on the high peaks during December.

VII.—UNITED PROVINCES.

(a) *Almora*.—The total falls for each of the months of the period are tabulated below:—

Locality.	October.		November.		December.	
	Ft.	In.	Ft.	In.	Ft.	In.
Malla Darma . . .	7	6	1	9	3	0
Malla Danpur . . .	1	0	..	..	1	0
Biyans . . .	12	3	3	9	4	0
Malla Johar . . .	..	..	..	..	3	6
Chaudash . . .	..	..	..	..	2	6

Snowfall was nearly normal in October and November but below normal in December.

The following is a table of accumulations at the end of each month during the period:—

Locality.	October.		November.		December.	
	Ft.	In.	Ft.	In.	Ft.	In.
Nuwe . . .	17	0	11	0	11	0
Lampia . . .	16	0	8	0	9	0
Lepu . . .	12	0	6	0	7	0
Pindari . . .	1	0	..	..	1	0
Kafini . . .	1	0	..	..	1	0
Kantila . . .	..	..	..	..	1	0
Puwalidwar . . .	1	0	..	..	1	0
Milain . . .	..	..	..	..	3	6
Bagdwar . . .	..	..	..	..	1	6
Bikarum . . .	..	..	..	..	9	0
Nandakote . . .	1	0	..	..	..	..

VIII.—ASSAM.

(a) *Kamrup*.—The first snowfall was rather later than usual and at the beginning of the season not heavy. There were frequent falls during December, none particularly heavy but aggregating to rather above the average.

(b) *Sadiya Frontier Tract*.—Snow was first seen on the 5th November on the Mishmi hills on peaks of about 11,000 ft. The severest snowfall during the period took place during the last week of December. The falls were normal during the period under report.

(c) *Baliapara Frontier Tract*.—It is reported that exceptionally heavy falls of snow occurred during November and December. The falls are reported to be later and heavier than usual.

Summary.

Cold weather period, January and February.—Afghanistan, Baluchistan and the North-West Frontier Province had an excess of snowfall. That in the United Provinces in February was also an excess. Normal conditions prevailed in the Punjab and in the United Provinces for January. The Baliapara Frontier tract in Assam was subjected to more severe falls than ordinary, while the rest of Assam had normal falls. Defect was recorded in Kashmir. Accumulations at the end of the period were generally normal on the hills in the North-West Frontier Province, Kashmir and the Punjab. In the hills in the United Provinces the accumulations at the end of January were in defect while they were in excess at the end of February.

Hot weather period, March to May.—Falls and accumulations were above normal in Afghanistan. Even at the end of May the accumulations on the Paghman range and on the Hindu Kush were reported to be above normal. Normal falls were reported from all the other provinces except from Kashmir which has recorded a defect. Accumulations on the high mountains were below normal in the North-West Frontier Province and Kashmir while they were normal in the Punjab, the United Provinces and Assam.

The Southwest monsoon period, June and July.—Normal falls and accumulations were reported from the North-West Frontier Province, Kashmir and the Punjab. The United Provinces experienced a slight excess.

The Southwest monsoon period, August and September.—Light falls occurred on the high mountains of Kashmir, with hailstorms in Gulmarg. Both the falls and accumulations in the province were normal. The United Provinces had an excess of falls and accumulations.

The retreating monsoon period, October to December.—The first fall of the season occurred on the 29th October in Afghanistan and on the 9th December in Baluchistan. The falls were above normal in Afghanistan and Assam, normal in Baluchistan and the North-West Frontier Province, and in defect in the remaining provinces. Accumulations were slightly above normal in the ranges of Afghanistan, normal in Kashmir and below normal in all the other provinces.

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